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D. E. SALMON, D. V. M., Chief of Bureau.

WASHINGTON, D. C., *September 28, 1903.*

SIR: I have the honor to recommend that the accompanying manuscript, the subject of which is "A form of hog cholera not caused by the hog-cholera bacillus," be published as a circular of this Bureau. This work, which has been carried on under my direction, portends results of great importance to the hog industry.

Very respectfully,

D. E. SALMON,
Chief of Bureau.

Approved:

JAMES WILSON,
Secretary of Agriculture.

A FORM OF HOG CHOLERA NOT CAUSED BY THE HOG-CHOLERA BACILLUS.

PRELIMINARY REMARKS.

During the course of the investigations concerning hog cholera which have been carried on by the Biochemic Division of the Bureau of Animal Industry, certain outbreaks of that disease were met with which apparently were not produced by the hog-cholera or the swine-plague bacilli. The disease was highly contagious and fatal to a large proportion of the hogs which were attacked. These observations, which were inexplicable previous to the researches herein recorded, together with the great variations in the physical symptoms and the postmortem lesions encountered in different outbreaks of so-called "hog cholera," have led us to institute experiments to determine, if possible, whether or not there are other infectious diseases among hogs in this country than those caused by the hog-cholera and swine-plague bacilli, and also to ascertain what was the etiological agent in those outbreaks of disease mentioned above, which apparently did not depend upon these bacilli for their existence. These experiments have not yet been completed, but have gone far enough to enable us to publish this preliminary note.

The outbreaks of disease which have furnished material for the study of the questions just outlined have all had their origin in southwestern Iowa, but, owing to the great distance of that point from Washington and the fact that it was not possible to establish a satisfactory laboratory in the field, it has been found necessary to expose a certain number of animals to infection in Iowa and then transport them by express to the Bureau Experiment Station near this city, where all the inoculations were made by the superintendent of the station. After once bringing the disease to Washington no trouble was, as a rule, experienced in perpetuating it by transferring from one animal to another.

The experiments have reached such a stage that we feel justified in stating that there is an infectious disease among hogs in this country which can not be distinguished clinically from hog cholera, and which may be reproduced by infecting with material which contains no hog-cholera bacilli. It will be understood that at this time no estimate can be made as to the frequency with which this disease occurs, nor as to its distribution throughout the country.

Below is presented a brief outline of the facts which have been established in regard to this disease.

ETIOLOGY.

Nothing can be stated at present as to the cause of this disease, although certain experiments, not yet complete, have given results of such a character that probably something more definite may be published in the near future in regard to the etiological factor in this form of hog cholera. It has been demonstrated, however, that the primary cause of this disease is neither the hog-cholera bacillus nor the swine-plague bacillus. We have transferred the disease repeatedly from one hog to another by subcutaneous inoculation of certain body fluids, these fluids being always proved, by careful bacteriological examinations, by filtration through the finest porcelain filters, and by the inoculation of guinea pigs and rabbits, to be free from hog-cholera and swine-plague bacilli. We have used a system of checks upon the various inoculation experiments by means of which we have been able to exclude all chance of accidental pen infection or of infection through the syringes.

The disease is highly contagious, healthy pigs that were allowed to come in contact with sick animals almost invariably becoming sick within the usual period of incubation. So far we have been unable to communicate this disease to any other animal than hogs. Rabbits and guinea pigs are entirely insusceptible to inoculations that are of sufficient size to destroy pigs weighing from 30 to 40 pounds.

SYMPTOMS.

The period of incubation after exposure to sick animals, or after a subcutaneous inoculation of infectious material from sick animals, varies from five to twelve days, the usual time elapsing between exposure and visible signs of illness being seven days. The first symptoms noticed are that the pig is slightly indisposed; there is loss of appetite and listlessness, but as a rule nothing else on the first day. By the second day of visible illness the animal is usually very sick, hollow in flanks, and has a staggering gait. There may or may not be diarrhea, and the feces are frequently blood stained. Almost without exception the eyes are sore and the lids glued together. The symptoms just enumerated become gradually more pronounced until the death of the animal,

which takes place as a rule within seven days after the appearance of the initial symptoms and approximately two weeks after the first exposure to infection.

It must be explained that the experimental pigs which we have used weighed from 15 to 40 pounds, and it is possible that in the case of older and larger animals the period of incubation and the course of the disease may be of longer duration. This point, together with many others, is left for future determination.

POSTMORTEM APPEARANCES.

The skin over the abdomen may be reddened throughout, or these cutaneous lesions may appear as more discrete purpuric areas of varying size. Upon removing the skin of the thorax and abdomen the subcutaneous areolar tissue is generally found to be thickly dotted with small ecchymoses. There is usually not the slightest evidence of inflammation at the point of inoculation if the animal has been injected subcutaneously.

LYMPHATIC SYSTEM.—The inguinal glands on both sides are reddened, as are the lumbar, retro-peritoneal, meso-colic, mesenteric, and bronchial glands. The reddening of these glands varies in intensity; at times the hemorrhagic condition is slight, while at others it is so intense that practically all of the glands are deep red, approaching black in color.

DIGESTIVE SYSTEM.—*(a) Stomach.* No lesions have been found in the stomach except small hemorrhages on its serous surface in about 50 per cent of the cases. *(b) The small intestines* usually present a large number of small ecchymoses on their serous surfaces and not infrequently the mucous surface is in the same condition. *(c) Cecum and colon.* This portion of the intestines, almost without exception, shows hemorrhagic areas on its serous and mucous surfaces, these hemorrhages being much fewer in number and larger in extent than those seen in the small intestines. In the cecum and ascending colon it is not unusual to find large numbers of small newly formed ulcers which occasionally show a hemorrhagic center. *(d)* In several instances there has been a most severe hemorrhagic inflammation of the *rectum* involving chiefly the serous surface and extending throughout its entire length. The intestinal contents are not infrequently blood-stained. *(e) Liver.* This organ is usually mottled, and exhibits numerous diffuse grayish areas which appear to be due to an increase of connective tissue. The histological examination of this organ is, however, not yet complete.

LUNGS.—The lungs frequently show small petechiæ on their surface, but are very slightly affected compared with the other organs.

HEART.—Hemorrhagic areas are occasionally seen on the surface of the auricles and ventricles.

SPLEEN.—The spleen is always enlarged, dark in color, and not infrequently shows small petechiæ on its under surface.

KIDNEYS.—The kidneys are always the seat of hemorrhagic changes, which vary in extent. At times the whole organ is intensely congested, with all the glomeruli being visible as minute, deep-red points, while at others it is as a whole not congested, but exhibits in its cortex a number of small, sharply defined, very dark hemorrhagic spots.

From the above-described lesions and symptoms it will be seen that this disease is apparently identical in all particulars with the acute type of hog cholera, and that it is produced without the aid of the hog-cholera bacillus.

The fact that this particular type of hemorrhagic hog cholera is so similar in both symptoms and lesions to the ordinary acute hog cholera supposed to be caused by the hog-cholera bacillus, and that, by our methods of inoculation, without the presence of the hog-cholera bacillus, we have never produced a case of *chronic* hog cholera, have led us to suspect that possibly in *all* outbreaks of *acute* hog cholera there is some other agent besides the hog-cholera bacillus at work, and that in those cases of acute disease where the hog-cholera bacillus is found we have to do, not with a pure infection, but with a mixed infection by hog-cholera bacilli and the organisms which are responsible for the disease which we have just described. In fact, virulent hog-cholera bacilli have been isolated from hogs in which the disease had been produced by inoculation with infective material in which the absence of the bacilli had been proved by filtration, by cultures, and by the inoculation of rabbits or guinea pigs.

If such supposition is well founded it is quite evident what an important bearing it must have upon the prevention and treatment of hog cholera, and we hope to be able to decide this point positively when the experiments now under way have been completed.

Sufficient work has been done to show that this particular form of hog cholera may be prevented by those measures which have been found to be effective in dealing with the ordinary forms of that disease—the isolation of sick animals and disinfection of all infected lots with carbolic acid and lime being sufficient to prevent a spread of the disease.

The question of special methods of treatment has been taken up and will be reported upon later.

In this brief report our object has been simply to announce the existence of this infectious disease among hogs, and we have purposely avoided the presentation of details of experiments, which are reserved for publication in a more complete treatise on the subject.

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